

Evaluation of NEMO model in the SoG

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1 Why do we pay attention to it?

The motivation and interest of this research are to find out to what extent NEMO model fits the observation in the SoG and how I modify the model in order to make it more accurate and more applicable. And thus it enables us to have a better understanding of ocean dynamics in the SoG.

2 Framework of my research proposal

(1) Introduce geography of SoG, like its location, circulation, wind field and etc. Also have a look at basic knowledge of river plumes.

(2) Introduce the NEMO model, like its parameters and coordinates and etc.

(3) Test the accuracy of surface currents of SoG using drifters.

(4) Test salinity, surface area and fresh water flushing time of Fraser River plumes between Ferry data and NEMO model results which are the outcomes after the run of model.

(5) Analyze the results by comparing observation data with model data and find out different impact factors contributing to the salinity, surface area and fresh water flushing time of Fraser River plume, like tide, river discharge and wind, and specify how they affect the Fraser River plume, and thus to modify NEMO model.

3 What do we do to realize it?(more detailed)

As for testing the surface currents of SoG, there are several database available for that, such as VENUS project's CODAR Seasonde HF radar in the lower SoG, and also drifters. But the former database exists the demerit that fresh surface water caused by the early summer freshet in the SoG would impact the accuracy of the observation. Then I decide to use tracks of drifters which are both available and effective to help analyze the surface currents of SoG. Besides, ADCP measurements in the southeastern could test the tides and determine whether they are good enough in the performance of surface currents.

When it comes to the evaluation of Fraser River plume, several steps should be specified. Firstly, I need to improve river treatment in the NEMO model, which includes selecting the appropriate river mouth points and depth. The concrete number of the depth of freshwater need to be confirmed by model experiments. Secondly, I could also extend the length of modeled river, which needs me to modify boundary of NEMO model, to detect much accuracy of river plumes. Thirdly, I should try to make grid smaller, which is equal to get higher resolution in the NEMO model.

The data I will use could be from STRATOGEM CTD which contains 48 cruises and were dated back to 2002. The ferry data are also crucial and I would like to take STRATOGEM into account, which was based on instrumented ferries which make repeated transects of SoG each day and started from January 2003 until October 2006. The measured variables included near-surface salinity, temperature which are essential to what I would use for.